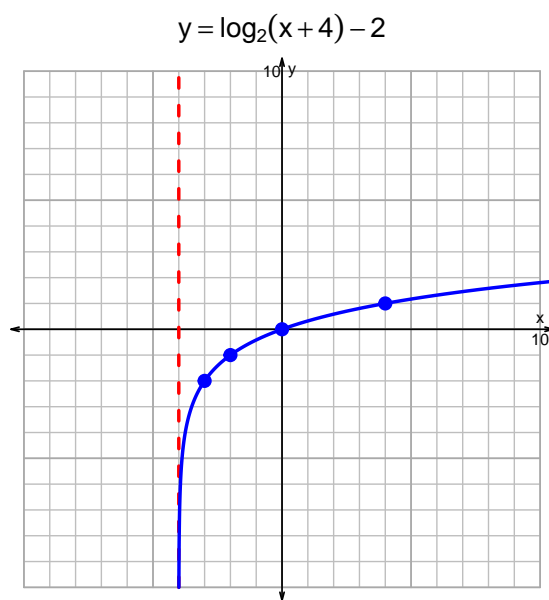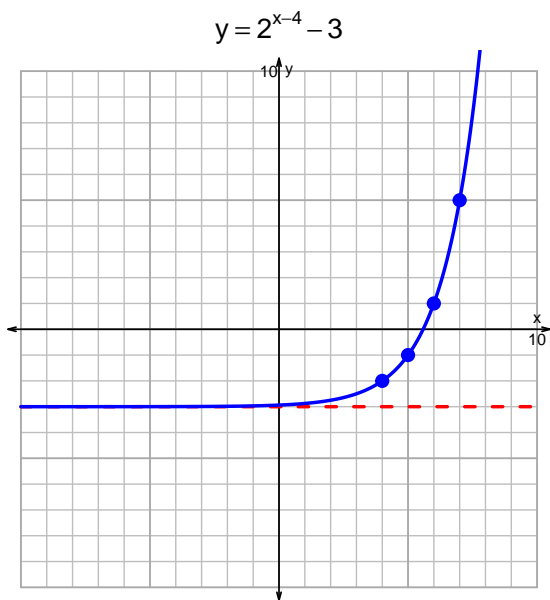## s18: EXP LOG (SLTN v339)

1. (10 pts) Graph $y = 2^{x-4} - 3$ and $y = \log_2(x+4) - 2$ on the grids below. Also, draw any asymptotes with dashed lines.

$y = 2^{x-4} - 3$

$y = \log_2(x+4) - 2$

Somewhat useful hint: $2^3 = 8$, *and thus* $\log_2(8) = 3$.

2. (10 pts) Write (but do not evaluate) the solution to the equation below by writing a logarithmic expression. Please do not do any arithmetic; just move numbers around.

$$-19 = \left(\frac{-7}{4}\right) \cdot 10^{3t/5}$$

Divide both sides by $\frac{-7}{4}$.

$$\frac{19 \cdot 4}{7} = 10^{3t/5}$$

Take log, base 10, of both sides.

$$\log_{10}\left(\frac{19 \cdot 4}{7}\right) = \frac{3t}{5}$$
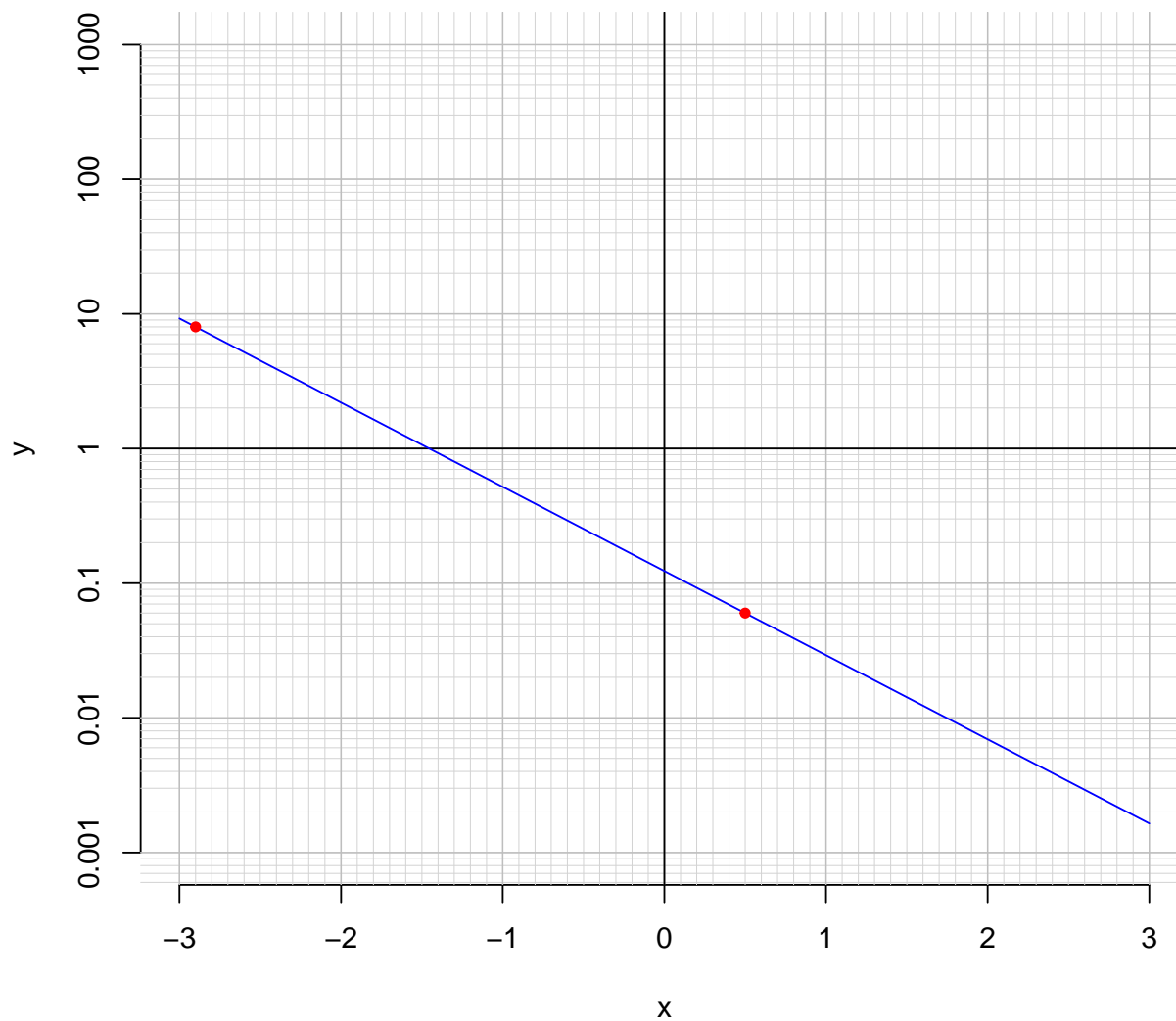
Divide both sides by $\frac{3}{5}$.

$$\frac{5}{3} \cdot \log_{10}\left(\frac{19 \cdot 4}{7}\right) = t$$

Switch sides.

$$t = \frac{5}{3} \cdot \log_{10}\left(\frac{19 \cdot 4}{7}\right)$$

3. (10 pts) An exponential function $f(x) = 0.123 \cdot e^{-1.44x}$ is graphed below on a semi-log plot.

a. Using the plot above, evaluate $f(0.5)$.

$$f(0.5) = 0.06$$

b. The inverse function is logarithmic.

$$f^{-1}(x) = \frac{-1}{1.44} \cdot \ln\left(\frac{x}{0.123}\right)$$

Using the plot above, evaluate $f^{-1}(8)$.

$$f^{-1}(8) = -2.9$$